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ABSTRACT

The effect of feedback on group cohesiveness (measured in terms of group and task attractiveness) for a person who is performing a simple, highly repetitive task was studied. One hundred business administration students, randomly assigned to five member groups, completed a series of trials having the goal of determining the number commonly held by the other members of their group as quickly as possible. In each group communication was restricted to written messages and partitions restricted the flow of messages among members according to a predetermined wheel or circle communication network. Half the groups participated in feedback at the end of each trial, the other half did not. All subjects were measured for their feeling of group and task attractiveness at the beginning, middle and end of the experiment. Based on a nested hierarchical design, feedback was found to positively affect a member's opinion of his group, but neither the opportunity for feedback, the network nor the individual's position within the network had a significant influence on the member's attractiveness to the task (findings are significant at the .005 level). The findings suggested group attractiveness was facilitated through formalized feedback mechanisms. However, feedback does not change an individual's opinion of the job performed. Similarly, programs designed to furnish feedback to workers performing menial tasks may not enhance the workers attractiveness to the job. (JB)

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THE EFFECT OF FEEDBACK ON GROUP COHESIVENESS

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ABSTRACT

THE EFFECT OF FEEDBACK ON GROUP COHESIVENESS

The purpose of this study is to determine the effect of feedback on group cohesiveness (measured in terms of group and task attractiveness) for a person who is performing simple, highly repetitive tasks. One hundred business administration students, randomly assigned to five member groups, completed a series of trials having the goal of determining the number commonly held by the other members of their group as quickly as possible. In each group communication was restricted to written messages and partitions restricted the flow of messages among members according to a predetermined wheel or circle communication network.

Half the groups participated in feedback at the end of each trial, the other half did not. All subjects were measured for their feeling of group and task attractiveness at the beginning, middle, and end of the experiment. Based on a nested hierarchal design, feedback was found to positively affect a member's opinion of his group, but neither the opportunity for feedback, the network, nor the individual's position within the network had a significant influence on the member's attractiveness to his task (findings are significant at the .005 level).

These findings suggest group attractiveness is facilitated through formalized feedback mechanisms. However, feedback does not change an individual's opinion of the job he is performing. In other words, programs designed to furnish feedback to workers

performing menial tasks may not enhance the workers attractiveness to his job.

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THE EFFECT OF FEEDBACK ON GROUP COHESIVENESS

Introduction

The successful functioning of business, like government, is dependent upon good communication throughout all levels of administration. To facilitate such communication, an organization may be subdivided into hundreds of small working groups. Since the activities of a small group depend to a large extent upon its information flow, it is important the communication act be studied as a means of increasing group efficiency.

Research performed by Bavelas[1], Collins and Raven[5], Mears[15], and Shaw[18] identifies communication networks as having an effect on group performance. Futhermore, research performed by Berkowitz[3], Cartwright[4], Lott[12], and Schacher[17] shows cohesiveness as an important variable affecting a group. In a group with high cohesiveness, the members desire to remain a part of the group, and they simultaneously like and cooperate with each other. Therefore, if group members are to have high performance and enjoyable working relationships, a knowledge of both communication networks and cohesiveness seems vital. This paper evaluates the effect of feedback on group cohesiveness in communication networks.

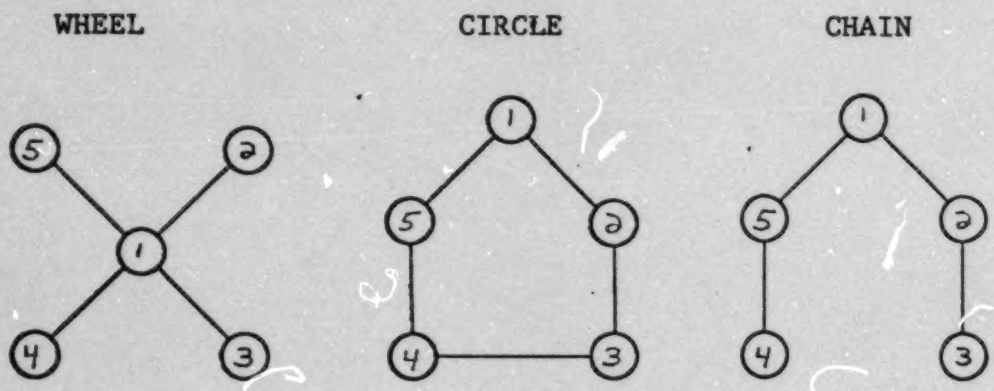
Communication Networks

A communication network is a predetermined structure which establishes the communication flow between participants. Because

the network establishes the flow of communication between the network members, the networks tend to restrict certain interactions among the group members. The early work performed by Graicunas[7], showing a supervisor with ten subordinates having 5,210 possible communication relationships, strenghtens the desirability of partially restricting rather than encouraging group interactions.

The three major types of communication networks are the wheel, circle, and chain. These networks are shown in Figure 1.

Figure 1
COMMUNICATION NETWORKS



○Denotes positon number of participant

Beach[2] offers an industrial analogy to help explain the variety of possible managerial applications of communication networks. The circle group might be a leaderless group of five people in comference to solve a problem. The chain group might be a five man organization with two levels of supervision. The wheel network would be an engineering group consisting of a supervisor who has several engineers reporting to him.

There appears to be a relationship between communication networks and organization charts. The organizational hierarchy affects communication by imposing the notion of channels through which communication must officially travel. The wheel network shown in Figure 1 is popularly referred to as an autocratic situation, but it is interesting to note the only difference between this network and an organizational chart is the conceptual arrangement of the circles on a piece of paper.

Bavelas and Barrett[1] reviewed the circle, chain and wheel communication networks in an attempt to determine the optimum communication system for use in a business organization. Before this study was made, the communication networks chosen had been selected by considering basic assumptions about human nature in general or in terms of a personal bias on the part of the chooser. The circle seemed to have no stable form of organization, while the chain revealed a slowly emerging but stable structure. The wheel had an immediate stable organization and most often had a leader emerge, but the morale of the members of the wheel network was not as high as the members of the circle network. Although the circle network was the slowest network having the poorest accuracy, this network had the highest moral.

Measurement of Morale

A question can be raised as to the validity of the measurement of morale in these early communication network studies. Moral was determined quantitatively by averaging the participant's answers to the following questions developed by Leavitt[11]:

How did you like your job in the group?

Dislike it _____ Liked it

0 25 50 75 100

Rate your group on the scale below:

Very poor _____ Excellent

0 25 50 75 100

Morale may not be a meaningful measurement of a members attractiveness to a group. Even if we follow the idea offered by Stagner[19] and limit the usage of the term to groups, Guion[8] identified the term "morale" as a composite of at least the following factors: working conditions, work load, job setting, financial return, supervision, fellow workers, personnel actions, and pride in the work group. These factors are not reflected in the broad measuring devices used by Bavelas and Leavitt. They were pioneers in the study of communication networks and they had to depend upon subsequent studies to add additional variables. However, it is important to remember the limitations on the measurement of morale to prevent over generalization about the findings of these early studies. Perhaps cohesiveness would be a more meaningful indicator of group attractiveness.

Cohesiveness

Festinger[6] defines cohesiveness as the resultant of all forces acting on the members to remain in the group. Cohesiveness becomes a binding force which holds group members together. In a group which has a high cohesiveness factor, group members have good morale

within the group and the group members both like and cooperate with each other. Cohesiveness is found in groups when the personal needs of the members can be satisified, and when personal gains such as prestige are attainable in the group. The cohesive group members have more individual attention and understanding.[9] These group members tend to exhibit cooperative interpersonal relations while striving to attain a common goal.

Studies by Schachter[17] and by Berkowitz[3] found high cohesiveness was not necessarily related directly to a high level of group productivity. Members of a highly cohesive group strongly supported the goals of the group. If the goal of the group was high productivity, then the members of the group tried to achieve this goal. However, if the group's goal was low productivity, the group members restricted output to attain their goal of low productivity.

Thompson pointed out that cohesiveness is an organizational need because the interdependence created by specialization makes the accomplishment of the organization's goals dependent upon cooperation[20]. A member of a cohesive group wants to remain a part of the group and would be likely to cooperate with the other group members. Lorge[12] offers the idea of group cohesiveness leading to the development of a team tradition, because each member will have assayed each other member for resources as well as individual personalities that will help in achieving a common goal.

Because cohesiveness is important to the performance of groups, consideration should be given to determine how cohesiveness can be effectively measured. This study measures cohesiveness in terms of the interpersonal attraction among members, the members evaluation of the group as a whole, the member's closeness or identification with the group, and his desire to remain in the group (these

variables were identified by Cartwright[4]), a sense of accomplishmemt, improvement in the way the group performs its tasks, and how an individual views his particular task within the group (these are suggested in the variables identified by Lott and Lott[12], although they make no attempt to measure these variables).

Feedback

Feedback appears to be an important variable in group communication concepts. A study by Zajonc[21] found the performance of a group improves when information about the group and each team member is made available. Studies by Pryer and Bass[16], as well as Maier and Hoffman[14], found groups with feedback were more effective than groups without feedback. Based on these studies it appears group performance is enhanced by feedback in the form of information relating to the group's output.

Research Design

This study tests the hypothesis that a person's feeling of cohesiveness is influenced by his position within the network, the network structure itself, and the opportunity for feedback. For example, the restrictive positions of the wheel network, other than the center position(see the number one position in Figure 1), allow interactions only with the center position, while the circle network allows interactions with two other positions. This problem of restricted interaction further compounds itself if a participant is a member of a non-feedback group but does not have the opportunity to discuss his individual performance. Such restrictions are likely to have a dysfunctional effect on group cohesiveness.

A communication network experiment was designed to furnish data for the study. The participants in the network experiment were seated with partitions between them which prevented either

visual or verbal contact with other network members. Communication between members could only be accomplished by passing written messages through slots in the partitions. These slots were arranged to achieve the communication flow of the wheel and circle networks.

Four types of networks were tested:

1) An Experimental Circle -EC- a circle structure which allows for feedback at the end of each trial;
2) An Experimental Wheel -EW- a wheel structure which allows for feedback at the end of each trial;
3) A Control Circle -CC- a circle structure which does not allow for feedback at the end of each trial;
4) A Control Wheel -CW- a wheel structure which does not allow for feedback at the end of each trial.

The experimental wheel network had the same structure as the control wheel, while the experimental circle network had the same structure as the control circle. In the experimental networks the members could elect to participate in feedback by discussing their accomplishments at the end of each trial. On the other hand, the control networks did not allow feedback to the network members.

The subjects for the study were one hundred university students who were taking business administration courses. They participated in the experiment as a requirement of the course they were taking and they received no pay for their services. These subjects were randomly assigned to the five positions within a network for each of the four network conditions (See Figure 1). Each participant was given an instructional sheet which described the total network restrictions and which contained five randomly generated two didgit numbers. Only one of these numbers was commonly held by all the participants in the network for a given trial. The goal of the group during a trial was to find the commonly held number as quickly as possible, while restricting conversation to passing written messages. After completion of a trial, the

experimental groups were allowed to engage in task related discussions, but the control groups were given no opportunity for feedback before beginning a new trial.

This study differs from the studies by Bavelas[1] and Leavitt[10] in respect to the subjects awareness of the groups communication restrictions, and the type of problem used for solution. In the Bavelas and Leavitt experiments, and individual participant was aware only of the restrictions governing his own activities. Because verbal communication between participants was not permitted, it would have been unlikely that a participant could have found out the restrictions imposed on other group members. This limitation appears unreasonable. A typical member of a small work group would tend to be aware of any communication restraints imposed on both himself and on the other members of the group. The work group could then adjust itself to conform to these limitations.

There were six basic figures used in the early communication experiments, and as pointed out by Bavelas[1], occassionally a participant would recognize there were only six possible symbols, and he would send the symbol that was not on his card. A "detour" solution of this nature would not be possible in a normal solution to a problem, and to prevent it from occurring in the present study two-didget randomly generated numbers were used for the problem solution.

The participants within each communication group were tested for cohesiveness at the end of the first, sixth, and eleventh trials. The first and second tests were identical to the third cohesiveness test (see Figure 2) except for the third question relating to improvements in accuracy.

The test to measure cohesiveness is shown in Figure 2 and is

FIGURE 2
COHESIVENESS TEST

IN MY OPINION, MY GROUP:

1. was excellent.

Disagree — Agree

2. completed the task quickly.

Disagree — Agree

3. was more accurate.

Disagree — Agree

4. worked together smoothly.

Disagree — Agree

5. had attitudes that were similar to mine.

Disagree — Agree

6. included people with whom I would enjoy working with again.

Disagree — Agree

7. How do you feel about your job?

Unimportant — Important

8. Easy — Hard

9. Boring — Interesting

10. Not Well Designed — Well Designed

subdivided into group attractiveness (the average answers to questions one thru six) and task attractiveness (the average answers to questions seven thru ten). Cohesiveness is measured in terms of both group and task attractiveness for each position within a communication network. The test is scored from one point for complete disagreement to five points for complete agreement.

Findings

The higher cohesiveness scores reflect a stronger feeling of cohesiveness. As can be seen in Table 1, stable opinions tended to emerge early in the communication network experiment. For example, the cohesiveness scores for the experimental circle network members changed from 3.41 for the first test to 3.84 (significant, $p<.05$) for the second test, to 3.94 for the third test (not significant, $p < .05$) The change of .45 between the first and the second test is greater than the change of .10 which occurred between the second and the third tests. In a similar manner, the cohesive scores of the other networds changed insignificantly between the second and the third tests.

TABLE 1
OVERALL COHESIVENESS SCORES
BY NETWORK

	Ex. Circle		Ex. Wheel		Control Circle		Control Wheel	
	$\bar{X}$	S^2	$\bar{X}$	S^2	$\bar{X}$	S^2	$\bar{X}$	S^2
1st Test	3.41	.22	2.58	.39	3.19	.16	2.71	.55
2nd Test	3.84	.18	3.76	.23	3.78	.31	3.18	.80
3rd Test	3.94	.17	3.77	.24	3.72	.41	3.33	1.08

The minute changes in the cohesiveness scores in the later trials of the experiment indicates the emergence of stable work patterns and opinions. The group members appear to be solidifying their feelings about their group as they acquired more experience in the communication network. The final cohesiveness scores should be carefully analyzed because these scores reflect the opinions of experienced network members who have developed a set pattern of interactions, and firm, lasting opinions.

At the end of the last trial, the experimental circle members gad the highest overall cohesiveness score of 3.94; and the second highest cohesiveness score of 3.77 occurred in the experimental wheel. The third highest score of 3.72 occurred in the control circle, while the lowest score of 3.33 occurred in the control wheel.

There is a statistically significant difference between some of these findings at the .05 level of significance. An "F" test was used to determine if the variation between the four groups (five members in each group) for each of the four communication networks was statistically significant. A one-tailed "T" test was used to test for differences between two networks.

The members in the experimental wheel had a higher cohesiveness score than did the members of the control wheel. Also, the experimental circle had a higher cohesiveness score than did the members of the control wheel. However, the control circle members had a statistically higher cohesiveness level than the control wheel members only at the .10 level of significance. Early communication network studies by Bavelas[1] and Leavitt[10] had a similar finding in that morale was found to be higher in the circle networks than in the wheel networks.

The question which next presents itself is-- is the higher cohesiveness due to the network or due to the existence of feed-

back? A nested hierarchal design was used to determine if feedback, the type of network, or the position of the individual within the network influenced either his group or task attractiveness scores. (See Figure 3, Nested Hierarchal Design. A detailed explanation of this type of analysis can be found in Johnston and Leone[10].)

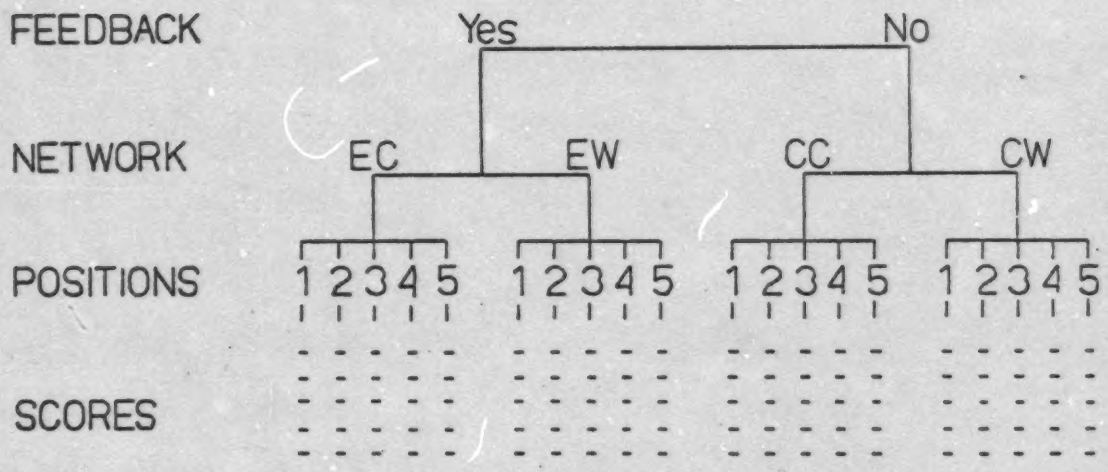
As can be seen in Table 2, Analysis of Scores, feedback was found to significantly influence group attractiveness ($p < .005$), but neither the opportunity for feedback, the network, nor the individual's position within the network had a significant influence on the attractiveness of his task. The overall task attractiveness score for both the feedback and non-feedback condition of 2.84 (s of .89) is rather low, particularly when compared to the overall group attractiveness score of 4.26 (s of .86). This difference is significant at the .001 level and indicates for simple highly repetitive tasks, feedback tends to favorably affect the individual's opinion of his task within the group.

Conclusions

The most dramatic difference among the network types can be attributed to the existence of feedback after each task. The feedback conditions of the experimental circle and the experimental wheel had a high index of group cohesiveness when compared to similar networks in the non-feedback condition. This finding suggests the opportunity for participant feedback is an important element in fostering a favorable group cohesiveness.

Although the members of the wheel network had limited communication channels compared to members of the circle network, there was no significant difference between the groups in terms

FIGURE 3
NESTED HIERARCHAL DESIGN



Where: EC-Experimental Circle; EW- Experimental Wheel
CC-Control Circle; and CW- Control Wheel
Positions one through five are as shown in Figure 1.

TABLE 2
ANALYSIS OF SCORES

Variance Source	Group Scores Mean Squares	Task Scores Mean Squares
Total	.746	.897
Feedback (yes or no)	7.371	.016
Network: EC,EW,CC,CW	1.046	1.683
Positions: 1,2,3,4, or 5	.332	1.388
Residual	.738	.791
Mean	4.259	2.843
Standard Deviation	.859	.889

of cohesiveness. For simple tasks, this finding suggests structural variations within a work group (which of course will effect the communication opportunity of a group member) does not significantly effect the cohesiveness of the group, for a given condition of feedback.

However, if one goes across feedback conditions and compares the cohesiveness of the experimental circle ($\bar{x}$ 3.94, s^2 .17) to the control wheel ($\bar{x}$ 3.33, s^2 1.08) not only is there a statistical difference in cohesiveness ($p<.05$), but the large variance indicates control wheel members differ greatly in their feeling of group cohesiveness. It is questionable if such a group could continuously operate together on a long term basis.

It is in management's interest to assist members of a work group in finding individual reward in group activities since this will lead to continued group cohesiveness. Group cohesiveness and continuity are necessary where group members are highly dependent upon each other to accomplish integrative tasks. To encourage the formation of group cohesiveness, organization structures should contemplate formalized mechanisms to provide feedback to the members of the work group.

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